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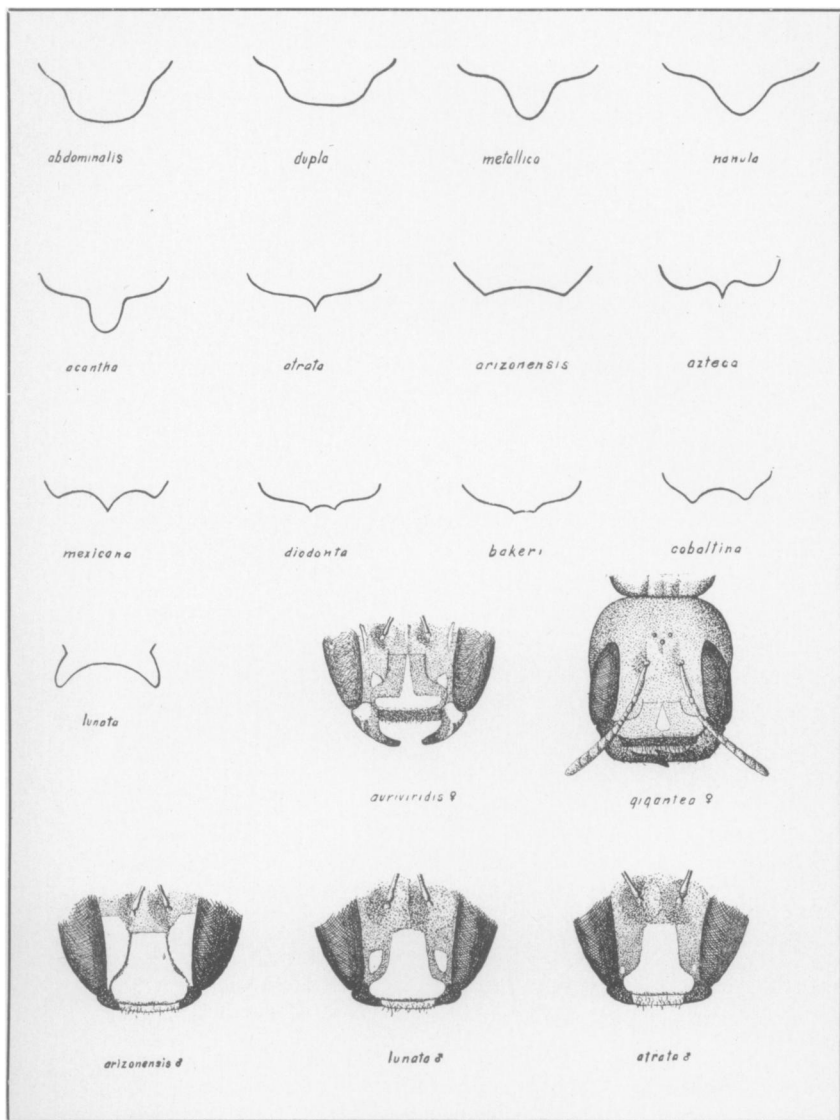
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**CONTRIBUTIONS TOWARD A MONOGRAPH OF
THE CERATINIDÆ OF NORTH AND
MIDDLE AMERICA.**

(Plate III)

BY HARRY SCOTT SMITH, LINCOLN, NEBRASKA.

It was the ambition of the writer, when this study was first undertaken about a year ago, to present at an early date a complete monograph of the family Ceratinidæ as represented in North and Middle America. Consequently numerous letters were written to different Hymenopterists and collectors throughout the country, with the object in view of getting together a large amount of material which would correctly represent the fauna of the territory which was to be included by such a study. For the region north of Mexico, in which the number of species is comparatively small, the results were fairly satisfactory, but for the remainder of the territory, Mexico and Central America, where the fauna is exceedingly rich and varied, it seems next to impossible to get material at the present time, owing to the scarcity of collectors in those localities. It is hoped that this paper, preliminary as it must necessarily be, will be effective in attracting the attention of collectors and others to these most interesting and beautiful little bees, and that within the not far distant future it will be possible to expand it into a complete and representative monograph of the family.

In all twenty-nine species are considered, of which nine are described as new, this number including all species known to have been recorded from the above region up to the present time. A large per cent. of the species from Mexico and Central America are known in one sex only, and this condition will of course exist until numerous specimens are brought to light from those localities. The greatest difficulty in the study of the genus is in the extreme similarity of the females of certain species, of which the males are very easily separated. In most cases, however, a close study of the puncturation and of the infuscation of the wings, together with the general habitus, will serve to separate them, although the differences are often hard to express in a table. Concerning the characters to

be used, the presence or absence of lateral face marks seems to be constant, and is used as one of the first divisions in the table to the females. The coloration of the tubercles, however, is not so reliable, although as a general rule it is a good character. I have a specimen of *dupla* with dark tubercles, also one of *pacifica*, yet these species are placed under the division having them light or cream colored. In the case of the males the shape of the apical plate is very constant, though often difficult to describe in words, but this is provided for by the sketches.

It is my pleasure to express thanks to Mr. Myron H. Swenk for his valuable criticisms and for looking over the manuscript, to Prof. L. Bruner, Mr. Henry L. Viereck, Prof. T. D. A. Cockerell, Mr. C. F. Baker and Abbe V. A. Huard for invaluable assistance rendered, and to many others who have by furnishing specimens or by other means aided me.

CERATINA Latreille.

Synon: *Zadontomerus* Ashmead, Trans. A. Ent. Soc., xxvi, p. 69.

Mr. Viereck has examined the mouth parts of a specimen of the type series of *C. tejonensis* Cresson, the type of the genus *Zadontomerus*, and finds the the maxillary palpi six-jointed, as in the other species. The triangular tooth on the hind femora is present in a majority of the species of *Ceratina*, and the shape of the apical plate is hardly generic in character.

SYNOPSIS OF MALES.

1. Black bees, with white marking and whitish pubescence; very small species; 3-3.5 mm.....2.
Metallic-blue or green bees; both large and small species3.
2. Apical plate concave, the concavity shallow; clypeus entirely white; the entire face below the antennæ white (Southwestern United States).
arizonensis Cockerell.
Apical plate crescent shaped, the corners acute; clypeus and two good-sized lateral face marks white (Texas)**lunata** n. sp.
Apical plate rounded, and with an acute triangular tooth medially; clypeus and two small lateral face marks white (Belize, British Honduras).
atrata n. sp.
3. Apical plate with two very small teeth medially; small species.....4.
Apical plate rounded, truncate, pointed, or obtusely bilobed.....5.
4. Face very narrow; mandibles with only a small white spot; teeth of apical plate blunt and indistinct; 3 mm.....**bakeri** n. sp.
Face broader; anterior margin of mandibles with a heavy white border; teeth of apical plate pointed and well defined; 3.5 mm...**diodonta** n. sp.

5. Apical plate obtusely bilobed; lateral face marks present; mandibles yellowish-white basally.....6.
- Apical plate of various shapes, but not obtusely bilobed.....7.
6. Interval between lobes with a small acute spine; legs dull red, shining.

rufipes F. Smith.

Interval between lobes without a spine; legs not dull red; color a brilliant blue-green; 8 mm. (Cuba)**cobaltina** Cresson.

7. Apical plate broad basally, but abruptly narrowed and then prolonged gradually into a narrow subacute projection medially8.

Apical plate not gradually prolonged into a narrow subacute projection; sometimes there is a small median projection, but the corners of the plate are then sharp, or else the posterior margin forms a double sinus..10.

8. Tubercles dark; median projection of apical plate relatively narrow; central arm of clypeal mark much shorter than the lateral ones; hind femora produced beneath to an angle less than a right angle; 4.5-6 mm. (*submaritima* Cockerell).....**acantha** Provancher.

Tubercles light; median projection of apical plate relatively somewhat broader.....9.

9. Occiput closely punctured; color bluish-green; hind femora produced into an angle greater than a right angle; 4.5 mm. (Southwestern States).

nanula Cockerell.

Occiput more sparsely punctured; color brassy-green; arms of clypeal mark about equal; anterior tibiae with a white line extending the entire length; 5-6 mm. (Pennsylvania).....**metallica** n. sp.

10. Apical plate broad at apex, rounded or subtruncate, never pointed; mandibles dark at base.....11.

Apical plate variously shaped, but not rounded or subtruncate at the apex as above; base of mandibles with a light spot.....15.

11. Tubercles dark.....12.

Tubercles white or cream colored13.

12. Abdomen of a coppery hue; head and thorax bluish-green; small lateral face marks present; wings dark smoky; 7 mm. (Central America).

abdominalis n. sp.

Abdomen bluish-green; lateral face marks absent; wings subhyaline; 9 mm. (California).....**tejonensis** Cresson.

13. Anterior tibiae reddish in front, with a very well-defined light stripe on the outer side; 5 mm. (Texas).....**strenua** F. Smith.

Anterior tibiae blue-green in front, light stripe on outer side poorly defined, or absent14.

14. Face and disk of dorsal abdominal segments closely punctured; color dark bluish-green (United States)**dupla** Say.

Face and middle of dorsal abdominal segments more sparsely punctured; cheeks sparsely punctured; color light, more yellowish-green (Western United States).....**neomexicana** Cockerell.

15. Wing nervures pale brown; mesothorax finely punctured; spots on face confluent with the clypeal marks; 9-10 mm. (Mexico).

mexicana Cresson.

Wing nervures black; mesothorax more coarsely punctured; spots on face not confluent with the clypeal marks; 10 mm. (Mex.)...**azteca** Cresson.

SYNOPSIS OF FEMALES.

1. Black bees with white markings and whitish pubescence; very small species;
3-4 mm.....2.
Greenish or blue bees, both large and small species.....3.
2. Scutellum sparsely punctured (Belize, British Honduras)....**atrata** n. sp.
Scutellum more closely punctured (Southwestern United States).
lunata n. sp.
3. Lateral face marks present.....4.
Lateral face marks absent.....9.
4. Abdomen bright crimson or carmine; head and thorax brilliant green....5.
Abdomen bluish or greenish.....6.
5. Legs pale ferruginous; wings subhyaline; size smaller, 8-9 mm. (Panama).
eximia F. Smith.
Legs green; wings smoky; size larger, 10.5-11.5 mm. (Mexico).
amabilis Cockerell.
6. Color extremely brilliant golden-green; face with a few broad, deep punctures; clypeus with a slender inverted T-shaped mark, not usually found in females; anterior tibiae with white stripe extending entire length; 4.5-6 mm. (Belize, British Honduras)....**auriviridis** n. sp.
Color not as above; clypeal marks of usual form.....7.
7. Color olive-green; lateral face marks elongated, reaching level of antennae (Panama)**punctulata** Spinola.
Dark bronze-green.....8.
8. Size large, 10-11 mm. (Mexico).....**mexicana** Cresson.
Size smaller, 7-8 mm. (Panama)**placida** F. Smith.
9. Tubercles white or cream colored10.
Tubercles concolorous with rest of thorax16.
10. Wings hyaline or smoky, nervures darker; head very large; abdomen olive-green; 9-10 mm. (Mexico).....**capitosa** F. Smith.
Wings hyaline or smoky, nervures darker; head not unusually large....11.
11. Wings clear hyaline, strongly iridescent; small species, 3.5-5.5 mm. (Texas).13.
Wings more or less smoky; both large and small species.....12.
12. Size large, 10 mm.; face and mesothorax anteriorly very sparsely punctured; wings very dark, especially on anterior margin; pleura with a large impunctate area above (Southern California)**pacifica** n. sp.
Size smaller, 8 mm. or less; pleura with no impunctate area, or with a very small one.....14.
13. Smaller, color more brass-green; wings very strongly iridescent; punctures of face broad.....**diodonta** n. sp.
Usually larger, color more bluish-green; iridescence of wings not so strong; punctures of face smaller**nanula** Cockerell.
14. Mesothorax in front sparsely punctured; wings strongly suffused with brown; abdomen sparsely punctured medially; 7-9 mm. (New Mexico).
neomexicana Cockerell.
Mesothorax in front closely punctured; wings not so dark as above; abdomen more closely punctured medially.....15.
15. Face closely punctured; bluish-green; wings only faintly smoky; cheeks more closely punctured; size larger, 7-8 mm. (U. S.)....**dupla** Say.

- Face with large, widely separated punctures; olive-green; wings slightly dusky toward apex; cheeks almost impunctate; size smaller, 4-6 mm. (Mexico, Central America).....**nautilana** Cockerell.
16. Wings yellowish, nervures almost colorless; head very large; abdomen olive-green; 9-10 mm. (Mexico).....**capitosa** F. Smith.
Wings either hyaline or smoky, nervures darker.....17.
17. Size very large, 11-13 mm.....18.
Size smaller, 6-9 mm.....19.
18. Color brilliant peacock-green; head strongly punctured; dorsal abdominal segments margined with black; length 11 mm. (Panama).
laeta Spinola.
Color dark blue; head finely and very sparsely punctured; head one and one-half times as wide as thorax; wings dark smoky; length 13 mm. (Southern California).....**gigantea** n. sp.
19. Color bright metallic-green; wings infuscated; head and mesothorax closely punctured; abdomen bluish-green, tip incurved; 6 mm. (Cuba).
cyaniventris Cresson.
Color bluish or bronze-green, not bright metallic as above.....20.
20. Head and thorax dark steel-blue or bluish-green.....21.
Head and thorax greenish, somewhat lighter22.
21. Abdomen coppery; wings strongly infuscated; cheeks sparsely punctured; 8 mm. (Central America).....**abdominalis** n. sp.
Abdomen tinged with olive-green, sometimes golden at apex; 7-9 mm. (Mexico).....**ignara** Cresson.
22. Face, abdomen and pleura more closely punctured; wings darker; 8 mm. (Mexico).....**townsendi** Cockerell.
Face, abdomen and pleura more sparsely punctured; wings not so dark; 5-6 mm. (Western U. S.).....(*submaritima* Ckll.), **acantha** Prov.

Ceratina lunata n. sp.

♂. Length 3 mm.—Shining black, with ivory-white markings. Face smooth and impunctate, or with only an occasional roughening of surface. Clypeus entirely ivory-white. Labrum with a large quadrate whitish mark medially and a dark spot laterally. Mandibles dark, rufous medially. Lateral face marks present, same color as clypeus and extending upward half way to its upper margin. Antennæ brown, inserted in broad, deep depressions, the two separated by a strong median ridge which has a single row of punctures on each side. Vertex smooth, occiput with a few punctures, cheeks entirely impunctate. Mesothorax punctured around the edges, impunctate on the disk. Scutellum and postscutellum very finely punctured, metathorax extremely so, the upper surface with a median depression. Pleura finely punctured, tubercles entirely white. Abdomen strongly narrowed basally. First segment impunctate, usually somewhat testaceous, remaining segments finely rugose-punctate, fringed with light hairs. Venter finely punctured, somewhat testaceous. Apical plate crescent shaped. Legs testaceous, anterior femora with a white stripe extending two-thirds of the length, tibiæ with stripe running entire length, tarsi yellowish. Posterior tibiæ with stripe running about half the length. Middle femora with an obtuse tooth such as is found on the hind femora of other species. Wings hyaline, strongly iridescent, basal part yellowish.

♀. Differs from the male as follows: size somewhat larger; clypeus with only a rectangular ivory-white mark; labrum and sides of face entirely dark; thorax more closely punctured; abdomen pointed at apex.

Described from 6 males and 2 females taken at Fedor, Lee Co., Texas, March and April, 1902, by Rev. G. Birkmann.

This species and the following one are the second and third black species described from North America, the only other described species being *C. arizonensis* Cockerell. The name *lunata* refers to the crescent-shaped apical plate of the male.

***Ceratina atrata* n. sp.**

♂. Length 3.5 mm.—Body shining black. Face impunctate, clypeus with the usual ivory-white T-shaped mark, the central arm about twice the length of the lateral ones, that portion of the face above them with a minute white dot. Labrum brownish with a median white patch, mandibles black, rufous toward the tips. Cheeks almost entirely impunctate, occiput with a very few irregular punctures. Antennæ brownish-black. Mesothorax with a narrow border of punctures, but smooth on disk excepting the longitudinally impressed lines. Scutellum and postscutellum finely punctured, metathorax still more finely so. First abdominal segment impunctate, remaining segments with fine punctures, the apical plate broad, with corners rounded and with a sharp point at the apex, like the lower edge of a shield, and finely punctured dorsally. Venter having segments fringed with silvery hairs. Legs black, tarsi ferruginous, anterior tibiæ with a broad white stripe in front. Tubercles white. Wings subhyaline, strongly iridescent, nervures and stigma dark brown.

♀. Differs from the ♂ in having only a broad rectangular stripe on the clypeus, no white on the labrum, and in the sparsely punctured scutellum.

Described from a pair from Belize, British Honduras, sent to me by Mr. C. F. Baker.

***Ceratina bakeri* n. sp.**

♂. Length 3 mm.—Dark bluish-green. Face comparatively very narrow, coarsely punctured, the punctures very sparse directly above the clypeus. T-shaped clypeal mark with central arm much longer and wider than lateral ones. Labrum whitish, with a black spot on each side. Mandibles lighter at tip. Cheeks sparsely but deeply punctured, occiput densely so. Mesothorax quite densely punctured, with three indistinctly impressed longitudinal lines. Scutellum and postscutellum finely and closely punctured. Superior face of metathorax longitudinally striate, posterior face punctate. First segment of abdomen almost entirely smooth, second and third finely punctured, remaining segments rugose, fringed with quite long whitish hairs. Apical plate shaped similarly to that of *C. diodonta*, the two teeth not so distinct, however. Legs green, tarsi ferruginous. Anterior tibiæ with a pale stripe running two-thirds of the way to base of tarsus, knees white. Tubercles white, wings hyaline, strongly iridescent.

Related to *C. diodonta*, but easily separated by the much narrower face and difference in sculpture.

Described from a unique male collected at Acapulco, Mexico.

Dedicated to Mr. C. F. Baker, from whom it was received, and who collected the type.

Ceratina acantha Provancher, Nat. Can., Vol. xxii (Dec., 1895), p. 190, ♀.

Synon. *C. submaritima* Cockerell, Proc. Acad. Nat. Sci. Phil. (Sept., 1897), p. 352, ♂, ♀.

Through the kindness of Abbe V. A. Huard, curator of the Provancher collection, I have examined the type of *C. acantha*, and find it identical with *C. submaritima* Cockerell, ♀, hence the former name holds by virtue of priority.

Ceratina diodonta n. sp.

♂. Length 3.5-5 mm.—Body shining, in general appearance somewhat like *C. nanula* Ckll., but smaller and of a more brassy color. Mesothorax sometimes with a tinge of purplish on the disk. Antennæ dark brown. Face much more coarsely punctured than in *bakeri*, clypeus with a large creamy-white inverted T-shaped mark, the three arms approximately equal, anterior margin darker. Lower side of face with a white dot or triangular mark on each side of clypeus. Labrum entirely white, but for a black dot on each side. Mandibles black, anteriorly with a heavy white border. Occiput more finely punctured than face, cheeks almost impunctate. Mesothorax finely punctured in front, with the usual impressed lines, almost impunctate on the disk. Scutellum finely punctured, postscutellum extremely so. Superior face of metathorax finely rugose, posterior face with fine punctures, smooth beneath, lateral faces similar. Pleura coarsely punctured like the face. First abdominal segment almost impunctate, next two finely punctured, sparsely so on the disk, remaining segments rugose, fringed with a few light hairs. Apical segment broad, but with two small teeth medially. Femora and tibiæ green, with whitish pubescence, tarsi testaceous. Tubercles white. Wings hyaline, strongly iridescent.

♀. Differs from the male by the more sparsely punctured face and occiput, the clypeal marking is merely an oblong mark, and the mesothorax is more sparsely punctured.

Described from numerous specimens from Fedor, Lee County, Texas, February 24th to April 27th, Rev. G. Birkmann, collector. The female of this species is difficult to separate from the female *nanula*, but differs in the more brassy color, smaller size and more iridescent wings.

Ceratina metallica n. sp.

♂. Length 5-6 mm.—Body entirely brassy-green, shining. Clypeus almost entirely white, the three arms of the clypeal marks about equal. Face coarsely and quite densely punctured, clypeus with numerous irregular indentations. Labrum with a quadrate white spot, mandibles black. Cheeks with distinct, well separated punctures, occiput with punctures close together. Mesothorax closely punctured, excepting on the disk, and with five longitudinally impressed

lines. Scutellum and postscutellum somewhat more finely punctured. First segment of abdomen with a few punctures in the middle, otherwise perfectly smooth, two and three finely and closely punctured, remaining segments rugose, six with a prominent brush of light hairs. Apical plate very narrow, as in *acantha* and *nanula*. Legs green, tarsi fulvous at tip. Knees with a white dot, anterior tibiae with a white line extending entire length. Tubercles white. Wings hyaline, strongly iridescent.

Described from two males from Sunbury, Pennsylvania, sent to me by Mr. C. F. Baker.

***Ceratina abdominalis* n. sp.**

♂. Length 7 mm.—Body shining, head and thorax dark bluish-green, sometimes æneous. Abdomen a brilliant coppery hue. Face with coarse, rather sparse punctures, quite irregular, clypeus impunctate. Antennæ black. Clypeus excepting the narrow reflexed anterior margin, a triangular space on the face on each side of the clypeus, and a quadrate spot in the middle of the labrum, yellow. Mandibles wholly black, or with the tips reddish. Labrum coarsely and sparsely punctured, clothed with a few pale hairs. Cheeks and occiput quite closely punctured, excepting a narrow impunctate area just behind the eyes. Posterior margin of the occiput strongly reflexed. Thorax finely punctured, disk impunctate and blackish in color, with five short, impressed longitudinal lines. Scutellum finely punctured, postscutellum more closely so, sometimes brassy-green in color. Dorsal portion of metathorax irregularly longitudinally striated, the truncation extremely minutely punctured, posterior face closely punctured above, more sparsely so below. Pleura with good sized punctures, about as far apart as their diameters, and clothed with sparse white pubescence. Tubercles concolorous with rest of thorax. Abdomen bright coppery, first segment impunctate, except on the disk, second and third segments finely punctured, remaining ones somewhat rugose. Venter brassy-green, closely punctured, each segment with a fringe of white hairs, tip of abdomen also with long pubescence, penultimate dorsal segment with a short median brush. Apical plate truncate, almost twice as broad as long, corners well rounded. Legs green, pubescent, tarsi ferruginous, with light fulvous pubescence on inner side. Wings dark smoky, strongly iridescent, tegulæ piceous.

♀. Differs from the ♂ as follows: length 8 mm., head proportionately somewhat wider than in ♂; clypeal marking consists of an obconic yellow spot, no lateral face marks, or marks on labrum; clypeus with a few coarse punctures. Apex of abdomen pointed.

Type.—♂ and ♀, Monte Redunda, Costa Rica, March, 1902. Thirty-two paratypes from above locality and Juan Vinas (L. Bruner), and one from San Marcos, Nicaragua (C. F. Baker).

***Ceratina auriviridis* n. sp.**

♀. Length 4.5–6 mm.—Brilliant peacock-green throughout, with bright golden reflections. Face with a very few broad, deep punctures, irregular in shape and size. Clypeus medially and spaces above lateral portions of clypeus impunctate, also a large space lateral to and above the antennæ extending to a line passing behind the lateral ocelli; a row of punctures form a V in front of

the ocelli. Cheeks almost entirely smooth, occiput coarsely punctured. Clypeus with an inverted T-shaped white mark, the arms very slender as compared with those of other species. A dot above the lateral portions of the clypeus, and a slender mark along the inner orbit of the eye about the height of the antennæ, also base of mandibles white, remaining portion rufous. Labrum entirely dark, sometimes ferruginous. Thorax closely punctured, smooth on the disk and with five distinct grooves, the lateral ones much shortened anteriorly. Scutellum with sparse, medium sized punctures, postscutellum finely and closely punctured. Metathorax with punctures of various sizes, those on the truncation being much the finer. The upper surface bears a short median carina. First segment of abdomen almost impunctate, next two finely and closely punctured, remaining segments rugose, last segment pointed and with a fringe of light hairs, each segment having a narrow black margin. Venter thinly pubescent. Legs green, tarsi and extreme portions of tibiæ ferruginous. Anterior tibiæ with a whitish stripe in front extending the entire length, femora with a white spot on the outer side. Pleura with thin white pubescence. Wings hyaline, faintly clouded at the tips, iridescent. Tegulæ light brown, tubercles green.

Described from two ♀ specimens from Belize, British Honduras, received from Mr. C. F. Baker.

This is a very pretty species, easily recognized by the golden-green color, puncturation and clypeal markings.

***Ceratina pacifica* n. sp.**

♀. Length 10 mm.—Dark bluish-green, shining. Clypeus with an oblong yellowish spot, with a very few coarse punctures, smooth on the disk. Mandibles and labrum black. Face very sparsely punctured, antennæ black, rufous beneath. Cheeks finely and very sparsely punctured, occiput much more closely so. Mesothorax also finely and sparsely punctured, impunctate on the disk, and with five longitudinal grooves. Pleura with a large impunctate area above. Scutellum sparsely punctured, postscutellum more densely so. Upper surface of metathorax roughened anteriorly, exceedingly minutely punctured on the truncation, posterior surface and metapleura finely punctured, the former with a deep longitudinal sulcus. First abdominal segment almost impunctate; two and three finely punctured, remaining segments rugose. Legs blue-green, with yellowish white pubescence, knees with a white dot, tips of tarsi ferruginous. Tubercles white. Wings smoky hyaline, nervures black.

Type locality, Wilson Peak, Los Angeles County, California, altitude 6000 ft.; also from Tehachapi Mts., altitude 4000 ft., Dr. A. Davidson collector; one specimen from Claremont, California, C. F. Baker collector.

This species presents a dimorphism, in the shape of cheek spines, similar to that found in some species of the genus *Perdita*.

***Ceratina gigantea* n. sp.**

♀. Length 13 mm.—Color blue-green. Head quadrate, width one and one-half times that of the thorax. Eyes comparatively very small. Clypeus very

short and broad, with a triangular whitish mark, sparsely punctured. Labrum large and black in color. Mandibles very heavy and strongly elbowed. Face sparsely punctured, cheeks and occiput almost impunctate. Mesothorax very sparsely punctured, smooth and purplish on the disk, and with the usual impressed lines. Scutellum and postscutellum finely and rather closely punctured. Anterior half of upper surface of metathorax rugose, remaining part extremely minutely punctured, strongly contrasting with the coarser punctures of the posterior face. Abdomen large and broad, finely punctured, posterior segments rugose. Venter clothed with fine grayish-white pubescence. Legs greenish-blue, clothed with light pubescence, knees having a white spot, tips of tarsi ferruginous. Tubercles concolorous with thorax. Wings smoky hyaline.

Described from one ♀ specimen, collected by Dr. A. Davidson in Tehachapi Mountains, California, altitude 4000 ft.

This species is rendered very distinct by its great size, and its large and peculiarly punctured head.